

IN THE CLAIMS

The status of the claims is as follows.

Claims 1-22 (Cancelled).

23. (Previously Presented) A band-gap reference circuit having a plurality of operating states which respectively correspond to a plurality of values of a band-gap reference voltage, comprising:

a current source;

a circuit branch coupled to said current source for receiving current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said current develops a combined voltage across said series connection of said resistor and said base-emitter diode;

a further base-emitter diode;

an adjustment circuit having an output coupled to said current source and having inputs respectively coupled to said circuit branch and said further base-emitter diode for adjusting the band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a start circuit having a first output connected to at least one of said inputs of said adjustment circuit for preventing operation in one of said operating states and a second output connected to said output of said adjustment circuit for applying a bias voltage to said output of said adjustment circuit.

24. (Previously Presented) The band-gap reference circuit of Claim 23, wherein said start circuit is for injecting a current into the emitter of said further base-emitter diode.

25. (Cancelled).

26. (Cancelled).

27. (Previously Presented) The band-gap reference circuit of Claim 23, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

28. (Previously Presented) A band-gap reference circuit, comprising:

a current source for generating a current, said current source normally requiring a response time to transition from a first operating state thereof wherein said current source actively generates no current to a second operating state thereof wherein said current source actively generates said current;

a circuit branch coupled to said current source for receiving the current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said received current develops a combined voltage across said series connection of said resistor and said base-emitter diode;

a further base-emitter diode;

an adjustment circuit having an output coupled to said current source and having inputs respectively coupled to said circuit branch and said further base-emitter diode for adjusting a band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a start circuit having a first output coupled to said output of said adjustment circuit that provides a bias voltage to said current source that rapidly turns on said current source thereby reducing said response time.

29. (Previously Presented) The band-gap reference circuit of Claim 28, wherein said start circuit comprises a pre-charge bias generator for applying a bias voltage to said output of said adjustment circuit.

30. (Previously Presented) The band-gap reference circuit of Claim 29, wherein said start circuit has a second output connected to said further base-emitter diode for injecting a current into the emitter of said further base-emitter diode.

31. (Previously Presented) The band-gap reference circuit of Claim 28, wherein said start circuit has a second output connected to said further base-emitter diode for injecting a current into the emitter of said further base-emitter diode.

32. (Previously Presented) The band-gap reference circuit of Claim 28, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

33. (Previously Presented) The band-gap reference circuit of Claim 28, wherein said band-gap reference circuit has a plurality of operating states which respectively correspond to a plurality of values of said band-gap reference voltage, and wherein a second output of said start circuit is coupled to said adjustment circuit and cooperable therewith for preventing operation in one of said operating states.

34. (Previously Presented) The band-gap reference circuit of Claim 33, wherein said start circuit injects a start-up current into the emitter of said further base-emitter diode.

35. (Previously Presented) The band-gap reference circuit of Claim 34, wherein said start circuit applies a bias voltage to said output of said adjustment circuit.
36. (Previously Presented) The band-gap reference circuit of Claim 33, wherein said start circuit applies a bias voltage to said output of said adjustment circuit.
37. (Previously Presented) The band-gap reference circuit of Claim 33, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

38. (Previously Presented) A cellular telephone, comprising:

a voltage regulator capable of generating a regulated output voltage;

analog-to-digital circuitry capable of converting analog signals into digital signals; and

a band-gap reference circuit coupled to said voltage regulator and said analog-to-digital circuitry and capable of supplying a band-gap reference voltage to said voltage regulator and said analog-to-digital circuitry, wherein said band-gap reference voltage is relatively constant across an operating temperature range, said band-gap reference circuit having a plurality of operating states which respectively correspond to a plurality of values of said band-gap reference voltage, said band-gap reference circuit including:

a current source;

a circuit branch coupled to said current source for receiving current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said current develops in said circuit branch a combined voltage across said series connection of said resistor and said base-emitter diode;

a further base-emitter diode;

an adjustment circuit having an output coupled to said current source and having inputs respectively coupled to said circuit branch and said further base-emitter diode for adjusting the band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a start circuit having a first output connected to at least one of said inputs of said adjustment circuit for preventing operation in one of said operating states and a second output

connected to said output of said adjustment circuit for applying a bias voltage to said output of said adjustment circuit.

39. (Previously Presented) The cellular telephone of Claim 38, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

40. (Previously Presented) A cellular telephone, comprising:

a voltage regulator capable of generating a regulated output voltage;

analog-to-digital circuitry capable of converting analog signals into digital signals; and

a band-gap reference circuit coupled to said voltage regulator and said analog-to-digital circuitry and capable of supplying a band-reference voltage to said voltage regulator and said analog-to-digital circuitry wherein said band-gap reference voltage is relatively constant across an operating temperature range, said band-gap reference circuit including:

 a current source for generating a current, said current source normally requiring a response time to transition from a first operating state thereof wherein said current source actively generates no current to a second operating state thereof wherein said current source actively generates said current;

 a circuit branch coupled to said current source for receiving the current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said received current develops in said circuit branch a combined voltage across said series connection of said resistor and said base-emitter diode;

 a further base-emitter diode;

 an adjustment circuit having an output coupled to said current source and having inputs respectively coupled to said circuit branch and said further base-emitter diode for adjusting a band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a start circuit having a first output coupled to said output of said adjustment circuit that provides a bias voltage to said current source that rapidly turns on said current source thereby reducing said response time.

41. (Previously Presented) The cellular telephone of Claim 40, wherein said band-gap reference circuit has a plurality of operating states which respectively correspond to a plurality of values of said band-gap reference voltage, and wherein a second output of said start circuit is coupled to said adjustment circuit and cooperable therewith for preventing operation in one of said operating states.

42. (Previously Presented) The cellular telephone of Claim 41, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

43. (Previously Presented) The cellular telephone of Claim 40, including a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

44. (Previously Presented)

A band-gap reference circuit comprising:

a current source;

a circuit branch coupled to said current source for receiving current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said current develops a combined voltage across said series connection of said resistor and said base-emitter diode;

a further base-emitter diode;

an adjustment circuit for adjusting a band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

45. (Previously Presented) A cellular telephone, comprising:

a voltage regulator capable of generating a regulated output voltage;

analog-to-digital circuitry capable of converting analog signals into digital signals; and

a band-gap reference circuit coupled to said voltage regulator and said analog-to-digital circuitry and capable of supplying a band-gap reference voltage to said voltage regulator and said analog-to-digital circuitry, wherein said band-gap reference voltage is relatively constant across an operating temperature range, said band-gap reference circuit including:

a current source;

a circuit branch coupled to said current source for receiving current generated by said current source, said circuit branch including a resistor having a positive temperature coefficient connected in series with a base-emitter diode having a negative temperature coefficient, wherein said current develops in said circuit branch a combined voltage across said series connection of said resistor and said base-emitter diode;

a further base-emitter diode;

an adjustment circuit for adjusting the band-gap reference voltage based on said combined voltage and a base-emitter voltage of said further base-emitter diode; and

a correction circuit coupled to said adjustment circuit and cooperable therewith for at least partially offsetting a drop-off in said band-gap reference voltage caused by said further base-emitter diode.

46. (Previously Presented) A band-gap reference circuit having a plurality of operating states corresponding to a plurality of values of a band-gap reference voltage, comprising:

- a current source for generating a current;
- a circuit branch comprising a resistor connected in series with a first base-emitter diode, wherein the current from the current source develops a combined voltage across the resistor and the first base-emitter diode;
- a second base-emitter diode;
- an adjustment circuit for adjusting the band-gap reference voltage based on the combined voltage and a base-emitter voltage of the second base-emitter diode; and
- a start circuit having a first output coupled to the adjustment circuit for preventing operation in one of the operating states and having a second output for applying a bias voltage to an output of the adjustment circuit.

47. (Previously Presented) A band-gap reference circuit, comprising:

- a current source for generating current;
- a circuit branch comprising a resistor connected in series with a first base-emitter diode, wherein the current from the current source develops a combined voltage across the resistor and the first base-emitter diode;
- a second base-emitter diode;
- an adjustment circuit for adjusting the band-gap reference voltage based on the combined voltage and a base-emitter voltage of the second base-emitter diode; and
- a start circuit having an output coupled to the output of the adjustment circuit for reducing a response time of the current source to transition from a first state where no current is generated to a second state where the current is generated.

48. (Previously Presented) A band-gap reference circuit, comprising:

a current source for generating a current;

a circuit branch comprising a resistor connected in series with a first base-emitter diode, wherein the current from the current source develops a combined voltage across the resistor and the first base-emitter diode;

a second base-emitter diode;

an adjustment circuit for adjusting a band-gap reference voltage based on the combined voltage and a base-emitter voltage of the second base-emitter diode; and

a correction circuit coupled to the adjustment circuit and cooperable with the adjustment circuit for at least partially offsetting a drop-off in the band-gap reference voltage caused by the second base-emitter diode.